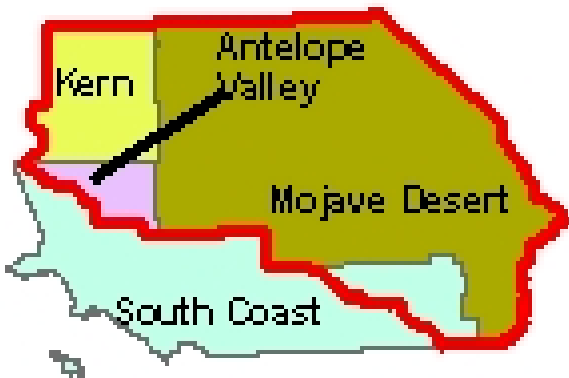


D. Mojave Desert Air Basin

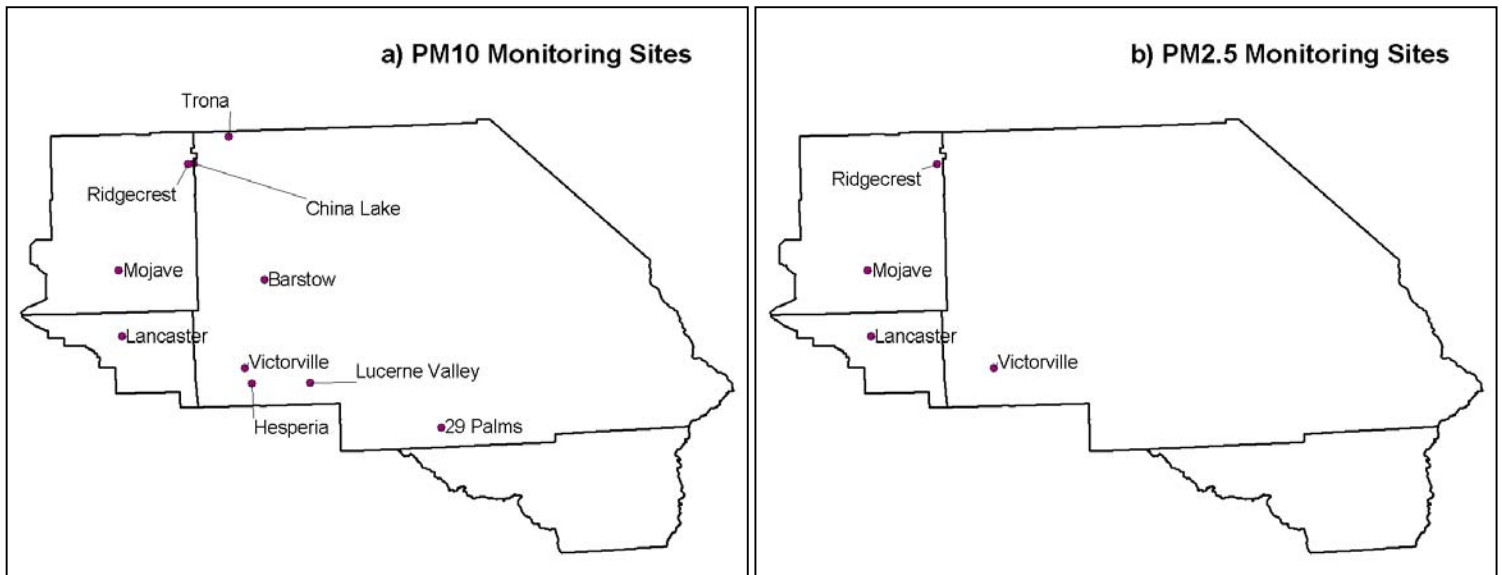


The Mojave Desert Air Basin is comprised of four air districts, the Kern County APCD, the Antelope Valley AQMD, the Mojave Desert AQMD, and the eastern portion of the South Coast AQMD. The Kern County APCD consists of the eastern portion of Kern County; the Antelope Valley AQMD consists of the northeastern portion of Los Angeles County; the Mojave Desert AQMD includes San Bernardino County and the most eastern portion of Riverside County; and the portion of the South Coast AQMD includes the eastern part of Riverside County.

The entire air basin is currently designated as nonattainment for both the State 24-hour and the annual average PM₁₀ standards, with only the western portion of the Mojave Desert AQMD designated as nonattainment for the State annual average PM_{2.5} standard. The San Bernardino portion of the Mojave Desert AQMD is currently designated as nonattainment for the national PM₁₀ standards. However, although this portion of the air district has not been officially redesignated, it has not exceeded these standards in many years.

Figure D-1 shows the PM₁₀ (a) and PM_{2.5} (b) monitoring sites throughout the Mojave Desert Air Basin. Sites are located in the more densely populated western portion of the air basin.

Figure D-1. PM₁₀ and PM_{2.5} Monitoring Sites throughout the Air Basin.



Kern County APCD

Table D-1 provides information on the yearly variations in the highest PM10 and PM2.5 concentrations recorded across the Kern County APCD in 2001 through 2003. During this period, particulate levels are estimated to have exceeded the State 24-hour PM10 standard of 50 $\mu\text{g}/\text{m}^3$ thirty times and also exceeded the State annual PM10 standard of 20 $\mu\text{g}/\text{m}^3$. Data are insufficient to determine if PM2.5 levels exceeded the State annual standard of 12 $\mu\text{g}/\text{m}^3$.

Table D-1. PM10 and PM2.5 Air Quality in the Kern County APCD.

Year	PM10 ($\mu\text{g}/\text{m}^3$)			PM2.5 ($\mu\text{g}/\text{m}^3$)	
	Calculated Days over State Std.	Max 24-hour (Std.=50)	Max Annual Average (Std.=20)	Max 24-hour*	Max Annual Average (Std.=12)
2001	6	112	20	15	Incomplete Data
2002	12	194**	24	31	Incomplete Data
2003	12	158**	22	23	Incomplete Data

* The maximum 24-hour PM2.5 values are provided for information only.

** These values were excluded for determining attainment status. See text.

Table D-2 provides the 24-hour and annual designation values for the State standards for the 2001-2003 period. Designation values represent the highest 24-hour PM10 concentration measured during the three year period, after concentrations measured during highly irregular and infrequent events have been excluded, and the highest estimated PM10 and PM2.5 annual average in the same period. For example, the maximum 24-hour PM10 concentrations in 2002 and 2003 shown in Table D-1 were identified as extreme concentration events and were excluded in determining the designation values shown in Table D-2. The designation values are determined for each site, and the highest site is used for determining an area's designation. Based on these data, the Kern County APCD currently is nonattainment for both the State 24-hour and annual average PM10 standards. The District is designated as unclassified for the State annual PM2.5 standard – available data are insufficient to support designation as attainment or nonattainment.

Table D-2. Air District Level Designation Values* for the State PM10 and PM2.5 Standards (2001-2003 Period).

	PM10 ($\mu\text{g}/\text{m}^3$)		PM2.5 ($\mu\text{g}/\text{m}^3$)
	24-Hour (Std.=50)	Annual Average (Std.=20)	Annual Average (Std.=12)
Designation Value	112	24	Incomplete Data

* Designation value is the value used for determining attainment status. It is the highest measured value over three years after excluding highly irregular or infrequent events.

Table D-3 provides designation values for each monitoring site in the air district to provide further information on the geographic distribution of concentrations. The data show that all three PM10 monitors in the Kern County APCD exceeded the 24-hour PM10 standard, with China Lake recording the highest concentrations. China Lake, however, did not exceed the PM10 annual standard of 20 $\mu\text{g}/\text{m}^3$, while the Mojave and Ridgecrest monitoring sites did. PM2.5 data are not yet complete enough to determine PM2.5 annual average concentrations.

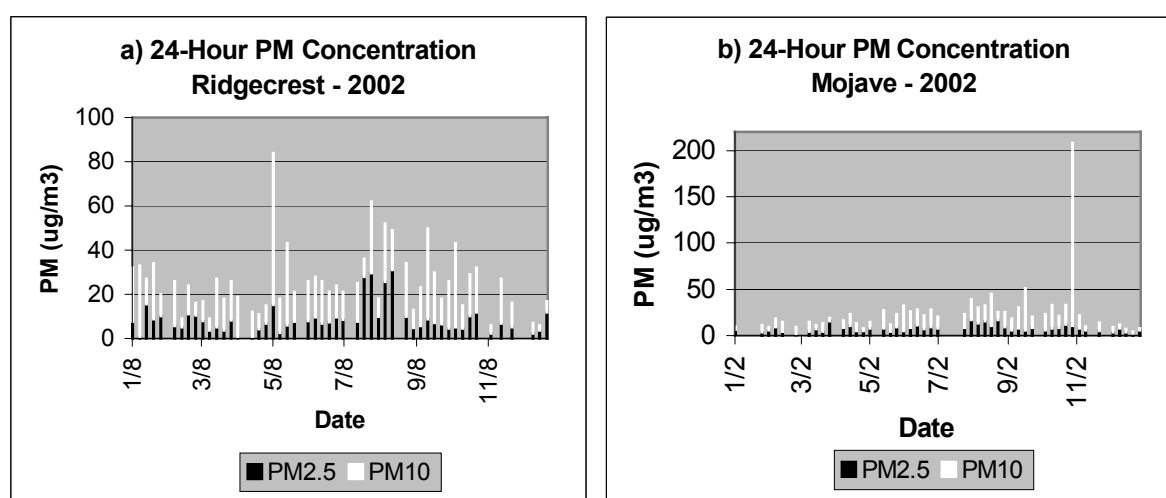
Table D-3. Monitoring Site Level Designation Values* for the State PM10 and PM2.5 Standards (2001-2003 Period).

Site	PM10 ($\mu\text{g}/\text{m}^3$)		PM2.5 ($\mu\text{g}/\text{m}^3$)
	24-Hour (Std.=50)	Annual Average (Std.=20)	Annual Average (Std.=12)
China Lake	112	15	No monitor
Mojave	93	21	Incomplete Data
Ridgecrest	78	24	Incomplete Data

* Designation value is the value used for determining attainment status. It is the highest measured value over three years after excluding highly irregular or infrequent events.

Figure D-2 illustrates the variation in PM10 and PM2.5 levels throughout 2002 at Ridgecrest (a) and Mojave (b). The total height of the bars represents PM10 concentrations, while the height of the black portion of the bars represents the PM2.5 fraction. At Ridgecrest, higher PM10 concentrations occurred during the spring through the early fall. During the spring and early fall, the coarse fraction (particles between PM2.5 and PM10 in size) drove the ambient PM10 levels, while during the late summer, the PM2.5 fraction was more prominent. The coarse fraction is primarily due to activities that resuspend dust, such as emissions from paved and unpaved roads and construction, as well as windblown dust. The very high PM10 concentration in October 2002 at Mojave for example was likely caused by fugitive wind blown dust. On an annual average, based on 2000-2003 monitoring data, we estimate PM2.5 comprises 32 percent of the ambient PM10 levels in the Kern County APCD.

Figure D-2. Seasonal Variation in PM10 and PM2.5 Concentrations.



Based on PM2.5 chemical composition data available from sites operated at China Lake, Edwards, and Mojave during the 2000 California Regional PM10 and PM2.5 Air Quality Study, the fraction of PM2.5 that is comprised of secondary ammonium nitrate and ammonium sulfate was approximately 40 percent on an annual average.

Antelope Valley AQMD

Table D-4 provides information on the yearly variations in the highest PM10 and PM2.5 concentrations recorded across the Antelope Valley AQMD in 2001 through 2003. During this period, particulate levels are estimated to have exceeded the State 24-hour PM10 standard of 50 $\mu\text{g}/\text{m}^3$ at least six times and also exceeded the State annual PM10 standard of 20 $\mu\text{g}/\text{m}^3$. Although data are insufficient to determine the calculated days exceeding the State 24-hour PM10 standard in 2002, one day measured PM concentrations exceeding the standard. In 2003, annual average PM2.5 levels were well below the State annual PM2.5 standard of 12 $\mu\text{g}/\text{m}^3$, but data were insufficient to determine if this was also the case in 2001 and 2002.

Table D-4. PM10 and PM2.5 Air Quality in the Antelope Valley APCD.

Year	PM10 ($\mu\text{g}/\text{m}^3$)			PM2.5 ($\mu\text{g}/\text{m}^3$)	
	Calculated Days over State Std.	Max 24-hour (Std.=50)	Max Annual Average (Std.=20)	Max 24-hour**	Max Annual Average (Std.=12)
2001	No monitor	No monitor	No monitor	No monitor	No monitor
2002	Incomplete Data	73*	Incomplete Data	24	Incomplete Data
2003	6	54	23	25	9

* The maximum 24-hour PM2.5 values are provided for information only.

** This value is excluded for determining attainment status. See text.

Table D-5 provides the 24-hour and annual designation values for the State standards for the 2001-2003 period. Designation values represent the highest 24-hour PM10 concentration measured during the three year period, after concentrations measured during highly irregular and infrequent events have been excluded, and the highest estimated PM10 and PM2.5 annual average in the same period. For example, the maximum 24-hour PM10 concentration in 2002 shown in Table D-4 was identified as an extreme concentration event and was excluded in determining the designation values shown in Table D-5. The designation values are determined for each site, and the highest site is used for determining an area's designation. Based on these data, the Antelope Valley AQMD currently is nonattainment for the State 24-hour and annual average PM10 standards. The District is designated as unclassified for the State annual PM2.5 standard – available data are insufficient to support designation as attainment or nonattainment.

Table D-5. Air District Level Designation Values* for the State PM10 and PM2.5 Standards (2001-2003 Period).

	PM10 ($\mu\text{g}/\text{m}^3$)		PM2.5 ($\mu\text{g}/\text{m}^3$)
	24-Hour (Std.=50)	Annual Average (Std.=20)	Annual Average (Std.=12)
Designation Value	54	23	Incomplete Data

* Designation value is the value used for determining attainment status. It is the highest measured value over three years after excluding highly irregular or infrequent events.

Table D-6 provides designation values for each monitoring site in the air district to provide further information on the geographic distribution of concentrations. Only a single monitoring site at Lancaster is operated in the District. As noted above, Lancaster exceeds the State 24-hour and annual average PM10 standards. Although data are not complete for all three years, the PM2.5 annual average concentration at Lancaster is below the State standard.

Table D-6. Monitoring Site Level Designation Values* for the State PM10 and PM2.5 Standards (2001-2003 Period).

Site	PM10 ($\mu\text{g}/\text{m}^3$)		PM2.5 ($\mu\text{g}/\text{m}^3$)
	24-Hour (Std.=50)	Annual Average (Std.=20)	Annual Average (Std.=12)
Lancaster	54	23	9

* Designation value is the value used for determining attainment status. It is the highest measured value over three years after excluding highly irregular or infrequent events.

Figure D-3. Seasonal Variation in PM10 and PM2.5 Concentrations.

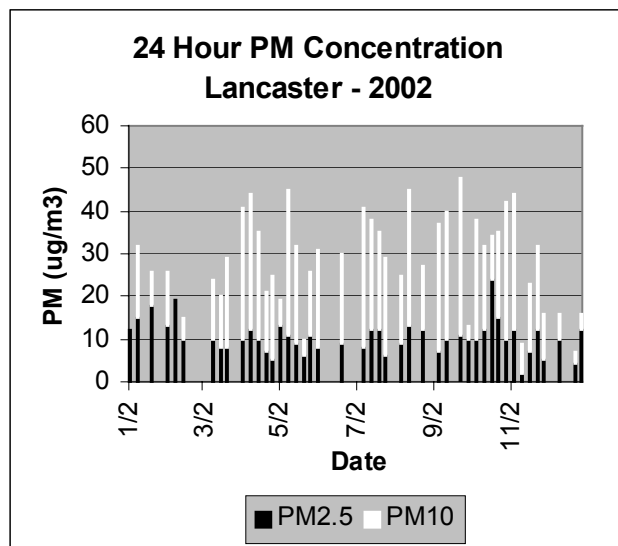
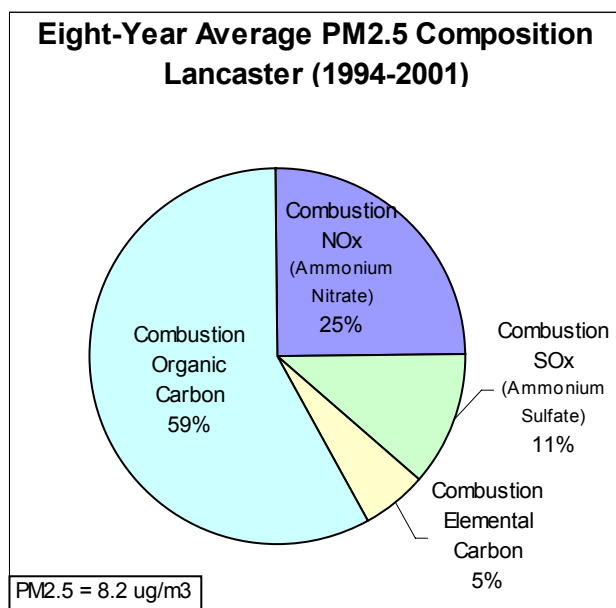


Figure D-3 illustrates the variation in PM10 and PM2.5 levels throughout 2002 at Lancaster. The total height of the bars represents PM10 concentrations, while the height of the black portion of the bars represents the PM2.5 fraction. PM10 levels were highest from spring through early fall and were driven by the coarse fraction (particles between PM2.5 and PM10), while PM2.5 concentrations remained low throughout the year. The coarse fraction is primarily due to activities that resuspend dust, such as emissions from paved and unpaved roads and construction, as well as windblown dust.

On an annual average, based on 2000-2003 monitoring data, we estimate that PM2.5 comprises

36 percent of the PM10 ambient levels.

Figure D-4. Eight-Year Average PM2.5 Chemical Composition and Link to Source Type.



Data for Figure D-4 are from analysis of ambient PM2.5 data collected at Lancaster as part of the Southern California Children's Health Study. The data show the major contribution to PM2.5 is from organic carbon (59 percent). The majority of organic carbon is expected to be due to directly emitted carbon from combustion sources. Key sources include vehicles, residential wood combustion, agricultural and prescribed burning, and stationary combustion sources. However, a fraction may be due to secondary organic aerosol formation from anthropogenic and biogenic VOC emissions.

Secondary ammonium nitrate and ammonium sulfate - formed in the atmosphere through chemical reactions of NOx and SOx from mobile and stationary source combustion processes, together contribute about 36 percent to PM2.5 levels. Elemental carbon from combustion sources also contributes to PM2.5 levels, but to a much lesser extent.

Mojave Desert AQMD

Table D-7 provides information on the yearly variations in the highest PM10 and PM2.5 concentrations recorded across the Mojave Desert AQMD in 2001 through 2003. During this period, particulate levels are estimated to have exceeded the State 24-hour PM10 standard of 50 $\mu\text{g}/\text{m}^3$ at least 18 times. PM concentrations also exceeded the State annual PM10 standard of 20 $\mu\text{g}/\text{m}^3$ and the annual PM2.5 standard of 12 $\mu\text{g}/\text{m}^3$.

Table D-7. PM10 and PM2.5 Air Quality in the Mojave Desert AQMD.

Year	PM10			PM2.5	
	Calculated Days over State Std.	Max 24-hour (Std.=50)	Max Annual Average (Std.=20)	Max 24-hour*	Max Annual Average (Std.=12)
2001	Incomplete Data	84**	Incomplete Data	32	12
2002	Incomplete Data	98**	Incomplete Data	38	14
2003	18	169***	28	28	Incomplete Data

* The maximum 24-hour PM2.5 values are provided for information only.

** Data are reported in standard conditions.

*** This value is excluded for determining attainment status. See text.

Table D-8 provides the 24-hour and annual designation values for the State standards for the 2001-2003 period. Designation values represent the highest 24-hour PM10 concentration measured during the three year period, after concentrations measured during highly irregular and infrequent events have been excluded, and the highest estimated PM10 and PM2.5 annual average in the same period. For example, the maximum 24-hour PM10 concentration in 2003 shown in Table D-7 was due to wildfires and was excluded in determining the designation values shown in Table D-8. The designation values are determined for each site, and the highest site is used for determining an area's designation. Based on these data, the Mojave Desert APCD currently is nonattainment for both the State 24-hour and annual average PM10 standards. The San Bernadino County portion of the District is also designated as nonattainment for the State annual PM2.5 standard.

Table D-8. Air District Level Designation Values* for the State PM10 and PM2.5 Standards (2001-2003 Period).

	PM10 ($\mu\text{g}/\text{m}^3$)		PM2.5 ($\mu\text{g}/\text{m}^3$)
	24-Hour (Std.=50)	Annual Average (Std.=20)	Annual Average (Std.=12)
Designation Value	129	28	14

* Designation value is the value used for determining attainment status. It is the highest measured value over three years after excluding highly irregular or infrequent events.

Table D-9 provides designation values for each monitoring site in the air district to provide further information on the geographic distribution of concentrations. All six monitors in the Mojave Desert AQMD recorded PM₁₀ concentrations exceeding the State 24-hour standard, with particulate levels at Hesperia also exceeding the State annual PM₁₀ standard of 20 µg/m³. 24-hour PM₁₀ concentrations were highest at Barstow, Hesperia, and Trona. Annual average PM_{2.5} levels at Victorville exceeded the State annual PM_{2.5} standard.

Table D-9. Monitoring Site Level Designation Values* for State PM₁₀ and PM_{2.5} Standards (2001-2003 Period).

Site	PM ₁₀ (ug/m ³)		PM _{2.5} (ug/m ³)
	24-Hour (Std.=50)	Annual Average (Std.=20)	Annual Average (Std.=12)
29 Palms	64	16	No Monitor
Barstow	129	Incomplete Data	No Monitor
Hesperia	119	28	No Monitor
Lucerne Valley	75	17	No Monitor
Trona	104	17	No Monitor
Victorville	63	Incomplete Data	14

* Designation value is the value used for determining attainment status. It is the highest measured value over three years after excluding highly irregular or infrequent events.

Figure D-5. Seasonal Variation in PM₁₀ and PM_{2.5} Concentrations.

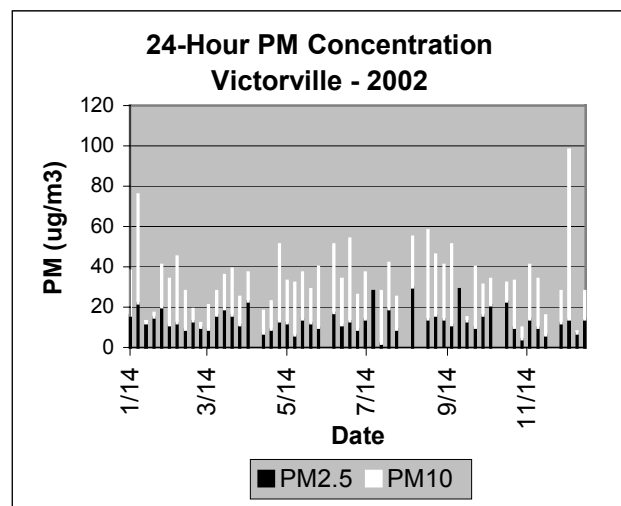


Figure D-5 illustrates the variation in PM₁₀ and PM_{2.5} levels throughout 2002 at Victorville. The total height of the bars represents PM₁₀ concentrations, while the height of the black portion of the bars represents the PM_{2.5} fraction. The two highest PM₁₀ concentrations occurred in December and January. PM₁₀ concentrations around the level of the State 24-hour standard occurred in the late spring and through the summer and were driven by the coarse fraction (particles between PM_{2.5} and PM₁₀). The coarse fraction is primarily due to activities that resuspend dust, such as emissions from paved and unpaved roads and construction, as well as windblown dust. PM_{2.5} concentrations were more uniform

throughout the year.

On an annual average, based on 2000-2003 monitoring data, we estimate that PM_{2.5} comprises approximately 38 percent of ambient PM₁₀ levels. Although no chemical composition data is available, based on data from the Kern County APCD portion of the air basin, we estimate that the secondary ammonium nitrate and sulfate comprise approximately 40 percent of PM_{2.5}.

South Coast AQMD

No PM10 or PM2.5 monitors are located in the South Coast AQMD portion of the Mojave Desert Air Basin.